MV electrical network management

DAX

Overcurrent fault detector for underground lines

Installer and user manual

Schneider Electric

Presentation

The DAX is an overcurrent fault detector for use on underground or underground and overhead MV networks.
It complies with Electricité Réseau Distribution France (ERDF) specification HN 45-S-50 of October 1981.

Supply

On delivery, check that the received equipment complies with the following supply list:
- The DAX detector, consisting of a box containing the electronic board and a battery
- One or three CTs and a connecting cable
- One or two indicator lights for external installation
- The installer and user manual.

The battery is:
- AA type (small) for a detector with auxiliary power supply
- D type (large) for a stand alone detector.

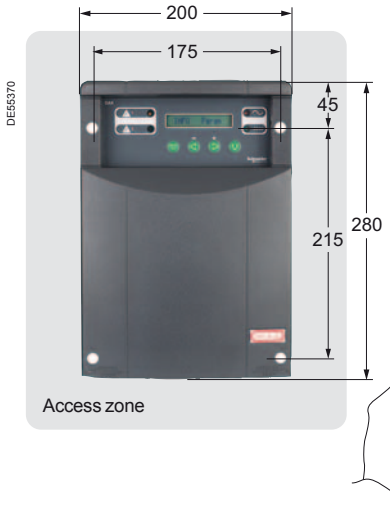
⚠ WARNING

When carrying out any work on a DAX detector with an auxiliary power supply, disconnect the power.

Mounting

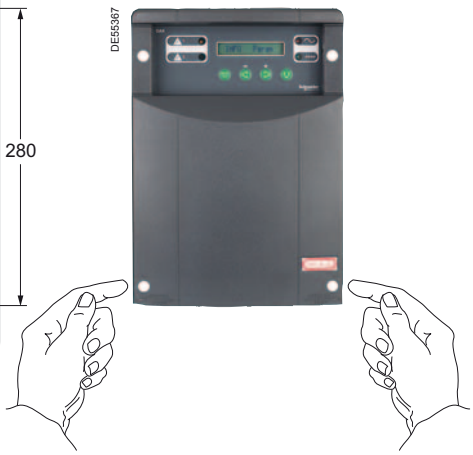
The DAX box is mounted without removing the cover, with four countersunk head screws of dia. 5 x 60 mm
Leave an access zone of 40 mm around the DAX box, to allow opening and clearance for the cover.

Dimensions

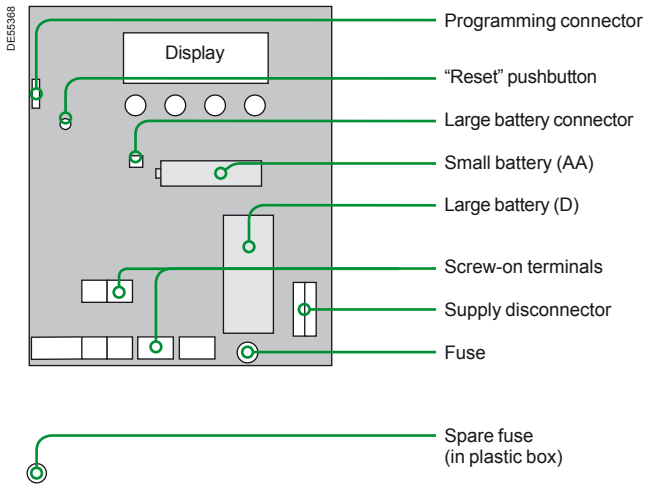


Box opening

To open the box, press slightly on either side of the lower part of the cover.
Then raise the cover.

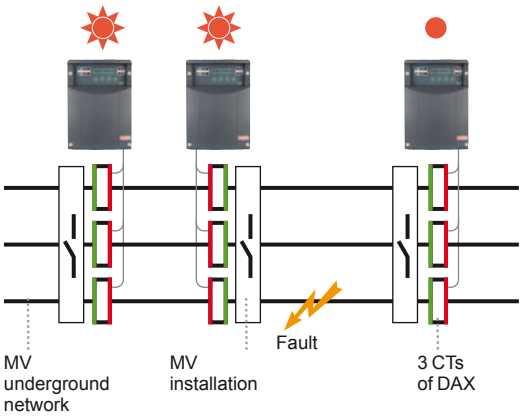


Electronic board architecture



Commissioning

DE55369



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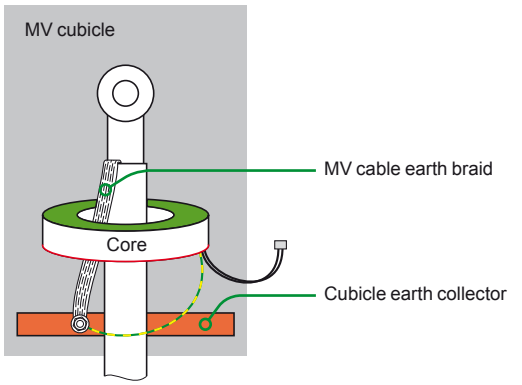

⚠ CAUTION

Pass the MV cable earth braid inside the CT.

CT connection

Install the three CTs around the MV cables in compliance with the positioning direction, green side towards the busbar and red side towards the grid. Connect the green/yellow wire of each CT secondary winding to the MV switchboard earth terminal and plug the two-pin connector of the CT secondary winding to the connector at the end of the "current input" cable termination.
Pass the "current input" cable through a detector cable gland and connect the cable termination to the four screw-on terminals (see cable diagram).

Connection of external indicator lights

Pass the "indicator light" cable through a detector cable gland and connect the cable termination to the two screw-on terminals (see cable diagram). Connect the other end of the cable to the indicator light. Make sure that the correct poles are connected.

Perform the same operation for the second indicator light (optional).

Connection of the remote operation cable

Pass the "remote operation" cable through a detector cable gland and connect the cable termination to the three screw-on terminals (see cable diagram).

Perform the same operation for the second remote operation channel (optional).

Connection of the external input cable

Pass the "external input" cable through a detector cable gland and connect the cable termination to the two screw-on terminals (see cable diagram). The second external input is not used in this product.

Battery installation

When using a detector with a small battery, install the battery in its support while ensuring that the correct poles are connected. The DAX detector starts.

When using the stand alone detector with a large battery, plug the battery connector into the board. The DAX detector starts.

Connection of the auxiliary supply

⚠ Check that the supply cable does not enter the box through the grey shaded area shown below or behind the box.

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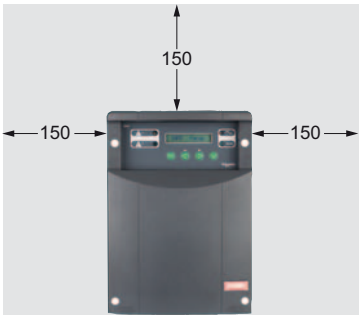


Pass the supply cable through the detector cable gland and connect the cable termination to the two screw-on terminals (see cabling diagram).

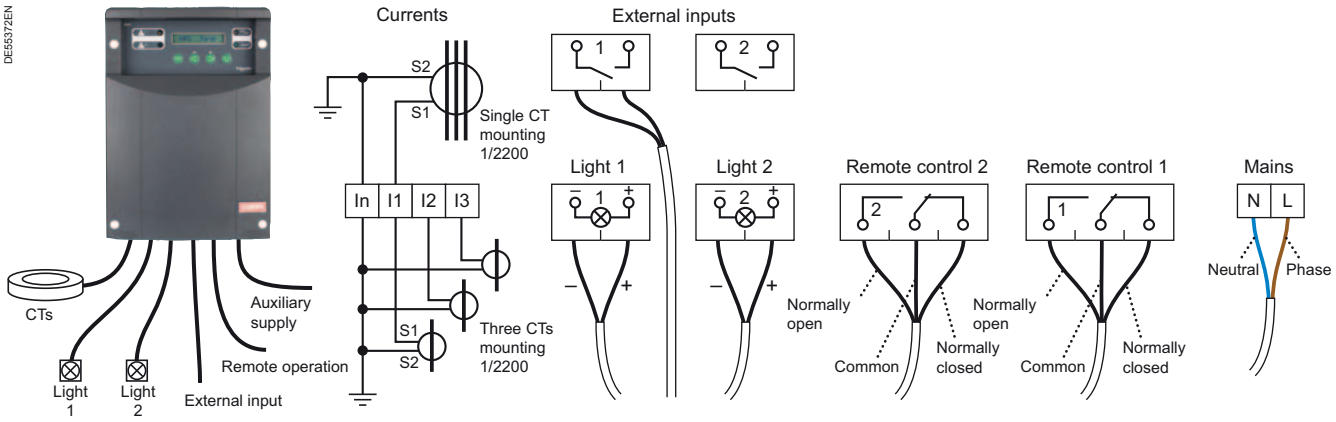
Make the supply circuit.
The internal red light, shown as a sinusoidal signal, comes on.

Configuration

The DAX detector can be configured using the display and the pushbuttons (Parameters Setup menu). More details on parameter changes are given in the "User's guide" section.

Commissioning

Wiring diagram of the DAX detector



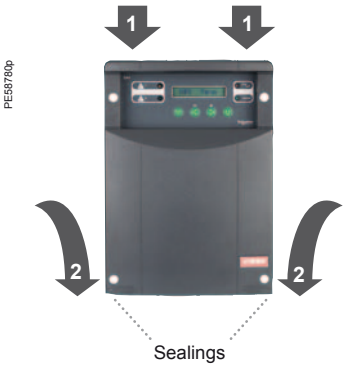
Changing the fuse

There is a spare fuse in the lower part of the DAX box base.
Its references are as follows: dimensions = 5 x 20, In = 250 mA fast-acting.

Changing the battery

The battery must be replaced if defective. In the case of a stand alone detector with a large battery, the securing collar has to be cut and changed.

When replacing the battery, the operating parameters and the meter values are stored in memory.

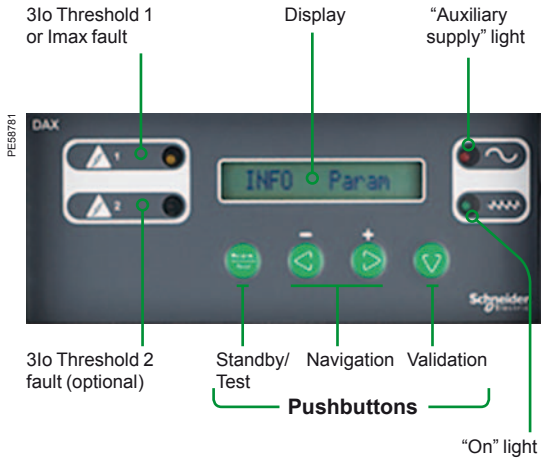


Box closure

To close the box, first insert the lugs on the upper part of the cover in the base. Close the cover down over the base until completely blocked. A lead seal can be placed on the lower part of the box.

Spare parts

Contact our after-sales service.



The DAX detector is activated as soon as the lithium battery is connected.
The detector displays the current version of the software followed by the main menu.

Man-Machine Interface (MMI)

The MMI consists of:

■ **An LCD display** presents the menus, parameters, values and messages on a 16-character display.

■ **Four pushbuttons:**
□ one pushbutton (Rearm Test) for setting the detector to standby (rearming), or starting the test mode on prolonged pressing
□ two pushbuttons ◁ and ▷ for navigating in the menus and scrolling through the parameter values
□ one pushbutton ▽ for validating a selection or an input value.

■ **Two to four internal indicator lights:**
□ a green light which comes on periodically to indicate that the detector is operating
□ a red light to indicate the presence of an auxiliary supply
□ a flashing yellow light to indicate detected faults associated with the thresholds 3Io Threshold 1 or Imax
□ a second flashing yellow light to indicate detected faults associated with threshold 3Io Threshold 2 (optional).

■ **One or two external lights**
These are connected and supplied by the DAX box and allow signalling of faults outside the substation (the second is optional); these two lights are linked to the two internal yellow lights.

In the absence of pushbutton operation, the display switches off automatically after a certain period of time. It can be started by pressing any pushbutton: it then displays the current version of the software, and if appropriate the fault currently indicated followed by the main menu.

Main menu

The DAX detector presents two options in the main menu:

■ INFOrmation menu: this displays the detected alarms and fault meters
■ PARAMetering menu: this allows the parameters to be consulted and/or changed.

The operator can:

■ Select a menu using the pushbuttons ◁ and ▷
■ Validate selection using the pushbutton ▽.

Information menu

The INFO menu allows display of:

■ If applicable, the currently indicated fault:
□ earth fault associated with 3Io Threshold 1
□ earth fault sequence associated with 3Io Threshold 2
□ phase fault associated with Imax threshold.

■ Meter (number of validated faults): overcurrent lasting longer than the validation period

■ Period > 40 ms (number of unvalidated faults): overcurrent lasting longer than 40 ms, but shorter than the validation period.

The operator can:

■ Consult this information using buttons ◁ and ▷

■ Reset the meters by prolonged pressing on the pushbutton ▽ when displaying a meter. Confirmation is requested. To do this, pushbuttons ◁ and ▷ allow the Yes option to be selected, then the operator validates confirmation using the pushbutton ▽.

Parameters Setup menu

The PARAM menu is used to consult and/or change the parameters in the following table:

■ READ submenu: this allows the parameters to be consulted using buttons and . The pushbutton serves no purpose

■ MODIFication submenu: this allows the parameters to be changed. This submenu is accessed by prolonged pressing on the pushbutton .

In the Modification submenu the operator can:

■ Scroll through the parameters using buttons and

■ Change the displayed parameters using the pushbutton ; the current parameter value starts to flash.
The operator selects a new value from the possible values using pushbuttons and , then validates the new value using pushbutton .

A confirmation is requested: to do this, pushbuttons and are used to select Yes, then the operator validates confirmation using the pushbutton .

Operating parameters

Title	Description	Possible values	Factory	Unit	Additional information
3Io Threshold 1	Zero sequence threshold 1	5 - 10 - 15 - 20 - 25 - 30 - 40 50 - 60 - 70 - 80 - 100 - 120 140 - 160 - 180 - ★★★	80	A	Special value shown by "★★★" disables earth fault detection. 3Io threshold 1 is the standard threshold.
3Io Threshold 2	Zero sequence threshold 2	5 - 10 - 15 - 20 - 25 - 30 - 40 50 - 60 - 70 - 80 - 100 - 120 140 - 160 - 180 - ★★★	★★★	A	Special value shown by "★★★" disables earth fault detection. 3Io Threshold 2 is available as option.
Imax	Phase threshold	225 - 450 - 630 - 700 - ★★★	450	A	Special value shown by "★★★" disables phase fault detection.
Validation	Fault validation period	60 - 100 - 200 - 300 - 360	300	ms	Duration above which the overcurrent is declared as being a fault, applicable to the earth faults and phase faults.
RL delay	Delay associated with remote operation contact changeover	0 - 50 - 90 - 140	0	s	Waiting time between activation of the indicator light and remote operation contact changeover. This delay is intended to filter transient faults (eliminated by the reset cycles) before their indication to remote operation.
Rearm Auto	Signalling duration	1 - 2 - 4 - 8 - 16 - 24 - 36 - 96	2	h	Duration above which the detector automatically switches to standby status after the appearance of the indicator light and in the absence of other conditions.
Rearm Ext	Return to standby status by external input changeover	Activated / Inhibited	Inhibited		The external input 1 of the detector is intended to receive an external contact in order to return the detector to standby status. Available as option.
Rearm Ubt	Return to standby status by the presence of auxiliary voltage	Activated / Inhibited	Activated		Available on the detector with auxiliary power supply.
Rearm I	Return to standby status by presence of current on MV grid	Activated / Inhibited	Inhibited		
Inrush	Filtering of inrush current	Activated / Inhibited	Inhibited		The detector is able to filter the inrush currents so that they are not considered as faults. This option cannot be activated if the "Rearm Ext", "Rearm Ubt" and "Rearm I" parameters are all inhibited or if the "Validation" parameter is less than 200 ms.
Light 1	Type of external lights installed	Fixed / Pulsating	Fixed		The detector can be connected to two types of indicator lights: "fixed" type as standard or "pulsating" type in some cases.
Contrast	Adjustment of the display contrast	–1 - 0 - +1	0		The display contrast can be adapted to the conditions of use.

Tests

After prolonged pressing on the "Rearm/Test" pushbutton, the DAX detector starts a test. This test involves activating the remote operation dry contacts and the internal and external indicator lights.

Activation of the dry contacts and the indicator lights stops as soon as the "Rearm/Test" pushbutton is pressed or after one minute.

Rearming modes

When the detector is in the fault signalling phase, it is rearmed (returned to standby mode) by the first activated condition from the following:

- Pressing on the "Rearm/Test" pushbutton
- The end of the signalling period (Rearm Auto)
- Switching of external contact input 1 (Rearm Ext), for the version equipped with this contact
- Presence of auxiliary voltage (Rearm Ubt), for the LV + battery version
- Current present in the CTs (Rearm I).

Maintenance

Small battery life: more than 8 years and 700 hours' signalling.

Replacement of the large battery: every 5 years (with 250 hours' signalling).

Schneider Electric Industries SAS

Schneider Electric Telecontrol
839 Chemin des Batterses - Z.I. Ouest
01700 St Maurice de Beynost
Tél.: +33 (0)4 78 55 13 13
Fax: +33 (0)4 78 55 50 00
http://www.schneider-electric.com
E-mail: telecontrol@schneider-electric.com

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